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BROOKS & KUSHMAN  
1000 TOWN CENTER 22ND FL  
SOUTHFIELD, MI 48075

EXAMINER

HARRINGTON, ALICIA M

ART UNIT PAPER NUMBER

2873

DATE MAILED: 05/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/549,464

Examiner

Alicia M Harrington

Applicant(s)

MCGREGOR ET AL.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 27 January 2003.
- 2a) ☐ This action is FINAL.
- 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) 31-43 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 24 May 2002 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_

- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### *Election/Restrictions*

Applicant's election of claims 1-30 in Paper No. 7 is still acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1,3,6,7,9,12, and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Kliever (US 4,574,197).

Regarding claim 1, Kliever discloses a dual field of view sensor for infrared night viewing system for implementing the claimed method comprising:

Detecting optically invisible radiation (see col. 2, lines 11-67 and col. 3, lines 1-9 and 40-67);

Processing the signals to obtain stereo data;

Displaying the stereoscopic data in the form of optically invisible radiation images superimposed on the night environment (see col. 3, lines 30-35 and col. 4, lines 1-9) so the user can obtain a 3D view of the radiation by utilizing natural human stereo imaging.

Regarding claim 3, as discussed above in claim 1, the HMD is night vision and the environment is an outdoor scene, thus, is an optically visible environment.

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Regarding claim 6, Kliever discloses a system is an infrared detection system (see abstract).

Regarding claim 7, Kliever discloses a dual field of view sensor for infrared night viewing system comprising:

Detector subsystem for detecting optically invisible radiant (see col. 2, lines 11-67 and col. 3, lines 1-9 and 40-67);

Signal processor for processing the signals to obtain stereo data;

Display subsystem for displaying the stereoscopic data in the form of optically invisible radiation images superimposed on the night environment (see col. 3, lines 30-35 and col. 4, lines 1-9) so the user can obtain a 3D view of the radiation by utilizing natural human stereo imaging.

Regarding claim 9, as discussed above in claim 1, the HMD is night vision and the environment is an outdoor scene, thus, is an optically visible environment.

Regarding claim 12, Kliever system is an infrared detection system (see abstract).

Regarding claim 26, Kliever discloses a stereoscopic imaging system (see abstract).

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Claims 2,8,30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kliever (US 4,574,197) in view of Inami (US 6,283,598).

Regarding claim 2, Kliever discloses, as discussed in claim 1, a dual imager HMD (96) for infrared detection. Kliever fails to specifically disclose an embodiment where the HMD is implement in a virtual environment. In a related field of endeavor, Inami discloses embodiments of a system for projecting images to the right and left eye of the user in a HMD to produce a 3-D image of an x-ray image for the user to see the image overlaid in the visible or virtual environment (see col. 5, lines 1-20 and col. 6, lines 34-60). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kliever, as taught by Inami, to provide visible image of radiation in a HMD, since converting x-ray images into visible imaging is known to HMD and it is known to provide the visible radiation images in a virtual environment.

Regarding claim 8, Kliever discloses, as discussed in claim 7, a dual imager HMD for infrared detection. Kliever fails to specifically disclose an embodiment where the HMD is implemented in a virtual environment.

In a related field of endeavor, Inami discloses embodiments of a system for projecting images to the right and left eye of the user in a HMD to produce a 3-D image of an x-ray image for the user to see overlaid in the visible or virtual environment (see col. 5, lines 1-20 and col. 6, lines 34-60). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kliever, as taught by Inami, to provide visible image of radiation in a HMD, since converting x-ray imaging into visible imaging is known to HMD and it is known to provide the visible radiation images in a virtual environment.

Regarding claim 30, as discussed in claim 7 above, Kliever fails to specifically disclose the system provides real time visual feedback and relative strength of at least on radiation source. Although, Inami discloses a stereoscopic HMD embodiment with real time feedback (see col. 6, lines 38-60) of the stereoscopic images. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kliever, as taught by Inami, to provide real time updates of projected images to account for change of the object in the environment which would be critical in military or health environments. However, Kliever and Inami fail to specifically disclose showing the relative strength of the radiation-emitting source. Although, a HMD displays that display system or object information in addition to the image is notoriously well known in the art. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that optically invisible radiation system could provide strength data of at least one radiation source to user and that such implementation as claimed lacks criticality.

Claims 4,5,10, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kliever (US 4,574,197), as discussed above in claims 1 and 7 respectively, further in view of Schoolman (US 4,737,972).

Regarding claims 4 and 10, Kliever discloses a dual imager HMD for infrared detection. Kliever fails to specifically disclose an embodiment for ionizing radiation.

In a related field of endeavor, Schoolman discloses a system for displaying visible images of x-ray images to the right and left eye of the user in a HMD (see col. 2, lines 5-16, col. 3, lines 62-69, col. 4, lines 1-5 and col. 5, lines 4-20). Thus, it would have been obvious to one of ordinary

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skill in the art at the time the invention was made to modify Kliever, as taught by Schoolman, to provide visible image of infrared or x-ray images in a HMD, since converting x-ray imaging into visible imaging is known to HMD and is useful to the medical profession.

Schoolman discloses, as in claims 5 and 11 turning x-ray image to visible images displayed using HMD system. Schoolman also discloses the x-ray images are formed by the left and right x-ray tubes irradiate x-ray image intensifiers (col. 1, lines 60-67). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a detected image with an energizing material and further obvious to implement the system in a HMD.

Claims 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kliever (US 4,574,197), as discussed above in claim 7.

Regarding claim 13-14, Kliever discloses using a single detector for providing multiple images. However, it is well known that a radiation detector system uses a set of area or point detectors. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kliever, to provide a set of detectors to take image, since it is a functional equivalent and is well known in the art of radiation detection.

Claims 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kliever, as applied above to claim 7.

Regarding claims 15-16, Kliever fails to specifically disclose whether the detector subsystem is active or passive. Further, active or passive detectors used in infrared detection systems are well known. Therefore, Kliever discloses the claimed invention with the exception of this feature,

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thus, it appears the invention would work equally as well with an active or passive detector, therefore active or passive detection lacks criticality since Kliever provides the claimed function.

Claims 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kliever (US 4,574,197), as disclosed above in claim 13, further in view of Schoolman (US 5,493,595).

Regarding claim 17, Klievers' system for stereo HMD where the stereo image is produced from infrared radiation using a single detector. And Kliever fails to disclose an embodiment using gamma radiation to provide visible images for stereo viewing.

In the same field of endeavor, Schoolman ('595) discloses using various types of radiation (such as gamma or x-ray) to provide visible stereoscopic 3D data to the user (see col. 9, lines 55-62, col. 10, lines 63-67, col. 11, lines 1-27, col. 12, lines 58-66) that was produced from a detector array. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kliever, as taught by Schoolman ('595) to expand/improve non invasive surgical imaging techniques in nuclear medicine incorporating HMD systems. Further, a gamma radiation images is well known to be produced by using a pair of gamma radiation detectors. Thus, it would have also been obvious to one of ordinary skill in the art at the time the invention was made to provide gamma radiation images for stereo viewing using a pair of gamma cameras, since it is well known in the art of gamma radiation imaging.

Regarding claim 18, as discussed in claim 17, Schoolman teaches using gamma radiation to produce stereo images. Schoolman also teaches implementing a gamma radiation image using a scanning gamma camera (see col. 10, lines 5-10). However, Kliever and Schoolman fail to specifically disclose the cameras are scanned through a plurality of angles to locate a source



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within the environment. However, that gamma ray scanning camera for taking images at plurality of angles to output three-dimensional images is well known in the art. These images identify detected radiation events of a source to produce multiple sets of data. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kliever and Schoolman, to incorporate scanning gamma ray cameras, since there usage in 3D imaging is well known to provide an quality output images on a display.

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kliever (US 4,574,197), as disclosed above in claim 7, further in view of Schoolman (US 5,493,595).

Regarding claim 19, Klievers' system for stereo HMD where the stereo image is produced from infrared radiation using a single detector. And Kliever fails to disclose an embodiment using gamma radiation to provide visible images for stereo viewing.

In the same field of endeavor, Schoolman ('595) discloses using various types of radiation (such as gamma or x-ray) to provide visible stereoscopic 3D data to the user (see col. 9, lines 55-62, col. 10, lines 63-67, col. 11, lines 1-27, col. 12, lines 58-66) that was produced from a detector array where the detector includes a collimator for directing radiation onto the scintillator (see col. 11, lines 10-20). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kliever, to provide images from gamma radiation detectors that provide quality radiation images using known structure of a collimator and scintillator.

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Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kliever in view of Schoolman ('595), as applied to claim 19 above, further in view of Jeanguillaume (US 5,448,073).

Regarding claim 20, Klievers' system for stereo HMD where the stereo image is produced from infrared radiation using a single detector. And Kliever fails to disclose an embodiment using gamma radiation to provide visible images for stereo viewing.

In the same field of endeavor, Schoolman ('595) discloses using various types of radiation (such as gamma or x-ray) to provide visible stereoscopic 3D data to the user (see col. 9, lines 55-62, col. 10, lines 63-67, col. 11, lines 1-27, col. 12, lines 58-66) that was produced from a detector array where the detector includes a collimator for directing radiation onto the scintillator (see col. 11, lines 10-20). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kliever, to provide an image from gamma radiation detectors that provides a quality radiation image using known structure of a collimator and scintillator. However, Kliever and Schoolman fail to specifically disclose the detector use a curved scintillator. Although, scintillators in ionizing radiation systems are well known as taught by Jeanguillaume.

In related field of endeavor, Jeanguillaume disclose a way to direct radiation to a curved scintillator crystal via a collimator. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a collimator and curved scintillator in the system of Kliever and Schoolman, since it directs incident radiation into the scintillator and provides a better resolution image as taught by Jeanguillaume.

Claims 21-24 are is rejected under 35 U.S.C. 103(a) as being unpatentable over Kliever, as applied to claim 7 above, further in view of Jeanguillaume (US 5,448,073).

Regarding claims 21-23, Kliever discloses a single detector for imaging. However, Kliever fails to specifically disclose the type of detector – area or linear. Jeanguillaume discloses the detector is a group of photo multiplier tube (see figure 11; col. 11, lines 47-65). Further, Jeanguillaume uses the group of photo multiplier tubes as a single moving detector to provide three dimensional good resolution images. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kliever, to use a compound eye detector to provide a good resolution image signal.

Regarding claim 24, as discussed above in claim 21, Kliever discloses using a single detector for stereo imaging. However, it well known in the art to using a single detector (group of photo multipliers) moving to provide data, as taught by Jeanguillaume.

Jeanguillaume discloses the detector is moveable through angles to provide enough coordinate information (col.2, lines 5-35) to provide a 3D reconstruction of an image. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use single detector moveable in three dimension to detect enough coordinate data to construct 3D/stereo images, as taught by Jeanguillaume, since it provides a good resolution 3D image.

Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kliever, as applied to claim 14 above, further in view of Jeanguillaume (US 5,448,073).

Regarding claim 25. Kliever discloses using a single detector for stereo imaging produced by the signal processor. However, it well known in the art to using a single detector

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(group of photo multipliers) to provide 3D data (map of the radiating emitting organ sources), as taught by Jeanguillaume.

Jeanguillaume discloses the detector is moveable through angles to provide enough coordinate information (col.2, lines 5-35) to provide a 3D reconstruction of an image. The coordinates (3D map) correspond to all detected emission from the organ of interest. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use single detector to detect enough coordinate data to construct 3D images, as taught by Jeanguillaume, since it also provides a good resolution 3D image.

Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kliever (US 4,574,197), as discussed above in claim 7.

Regarding claim 27, Kliever fails to specifically disclose the detector subsystem is portable. However, the Examiner takes official notice that HMD with portable detector systems are notoriously well known in the art. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kliever, to provide a portable detector system, as it increases the versatility of the system and is known in the prior art to be portable.

Claims 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kliever (US 4,574,197), as discussed above in claim 7.

Regarding claim 28-29, Kliever discloses the display system for use with a HMD display. However, it is notoriously well known in the art to incorporate stereoscopic viewing in HMD where the HMD includes a see through display and tracking system, official notice is taken to

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this fact. The see through display system typically use LCD panels- official notice is taken to this fact. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kliever, since it is well known in HMD display environments, and it provides stereo and real scene viewing to the user.

### *Conclusion*

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Diepeveen et al (US 4,682,029) discloses a stereoscopic infrared imager having a time based detector array;

Zhang (US 6,476,391) discloses an infrared imaging system for advanced rescue vision system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alicia M Harrington whose telephone number is 703 308 9295. The examiner can normally be reached on Monday - Thursday 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on 703 308 4883. The fax phone numbers for the organization where this application or proceeding is assigned are 703 308 7724 for regular communications and 703 308 7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0956.

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AMH

May 5, 2003



Alicia M Harrington

Examiner

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RICKY MACK  
PRIMARY EXAMINER